AM-7PD High-Efficiency Dual-mode LED/Lamp flasher with TracSwitcher technology

*The First **low EMI Emission** Lamp flasher in the world*

AM-7PD is a compact 4-channel LED flasher. It has the same form factor as the venerable Elco/MK-III flasher. Inside the housing, however, AM-7PD is an all-new designed device that **c**ombines state of the art electronic technologies and Pharos Marine/Automatic Power's long-standing expertise in Marine Aids to Navigation. Regardless of its small, compact size, AM-7PD is not compromised in features and reliability.

1) AM-7PD supports both LED array and standard 10.3V dual-filament incandescent lamp up to 22W.
2) 255+1 flashing characteristics. 255 codes are factory programmed. One code is user programmable.
3) 15+1 LED intensity levels. 15 levels are factory programmed. One level is user programmable (LED mode only).
4) Adjustable Day/Night photocell thresholds.
5) Adjustable Solar Charging Thresholds.
6) Programmable synchronization effects.
7) Automatic Monitoring and Flasher Protection against LED failures (both open/short circuits) (LED mode only).
8) Automatic change over to the second filament when the first filament fails (Lamp mode only).
9) **Very low EMI emissions**.
10) Manual sleep mode.

AM-7PD incorporates API's TracSwitcher technology for superior energy efficiency. 80%-90% (over the full operating voltage range) of power taken from battery is delivered to the load (LED array or incandescent lamp). Higher efficiency not only reduces the system cost by requiring less battery capacity, it reduces heat dissipation by the LED driver transistors as well, making it possible to use smaller surface mount parts and boost reliability.

The TracSwitcher also regulates voltage applied to the filament in Lamp mode. Comparing to the PWM technology used in other lamp flashers, this technology is much more "GREEN" because it has very low EMI emission, which is very friendly to other adjacent equipment and wireless communications. PWM in other flashers, on the other hand, regulates the lamp voltage by chopping the input voltage to a certain duty-cycle in frequencies ranging from 260Hz to over 1KHz. The waves of ON/OFF lamp current of a few Amperes or more flowing in the power supply wires emit great EMI noises.

IMPORTANT: Never drive a LED array in the Lamp mode. While lamp is a voltage device, which requires constant voltage to work properly, LED is a current device. In

lamp mode, the output voltage of AM-7PD is fixed at 10.3V, which is much higher than the threshold voltage of the LED arrays. **Over-voltage LED is like a short circuit that will destroy the LED array in a very short time.**

For easy operation, AM-7PD has on-board switches for setting flash codes and LED intensity in the field. You can easily choose any one of the 256 factory installed flash characteristics and 16 different levels of intensities.

Like other AM-series flashers, AM-7PD goes beyond that by being able to be user programmable, with our free APICalibrator II software, which runs on Windows PCs. So, if the factory codes do not meet your needs, or if you want a different intensity other than the 16 standard ones, you simply use the APICalibrator II to enter your special flash code or intensity into the flasher. The data you enter is saved in non-volatile memory of the flasher, which retains its content even after the flasher loses its power.

AM-7PD has been tested to meet or exceed the EN61000-4-2 requirement. It has survived 8KV **CONTACT** discharge test, when the standard only calls for 4KV contact discharge and 8KV air discharge.

APICalibrator II also allows you to control other features of the flasher. Please keep in mind that all user entered data is saved in non-volatile memory and will survive power interruptions.

- Day/Night photocell thresholds. Our flasher uses a photo-resistor to sense the intensity of ambient daylight. The resistance of the photo-resistor continuously changes with the ambient intensity. The flasher reads the resistance and compares it with a set of two preset numbers. When the flasher finds out the resistance of the photocell is higher than the setting for Night level, it starts to flash. When the resistance is lower than the number set for Day level, the flasher stops flashing. APICalibrator II allows you to change the two resistance levels that control the Day/Night switching. So you can customize the flasher to suite your special needs (foggy, rainy …)
- Battery charging thresholds for solar panel. AM-7PD has a built-in battery charging solar-panel controller. The charging voltage thresholds have been set up for 12V battery systems at factory. Nevertheless, it is very easy to change the thresholds to make it work in, for example, 24V battery systems. Using APICalibrator II, you simply enter into the flasher a value for cut-off voltage and a value for re-start voltage. Subsequently, the flasher will disconnect your battery from the solar panel when it sees the battery voltage reaching the cut-off voltage. It will re-connect the solar panel to the battery when battery voltage becomes lower than the re-start voltage. This mechanism can also protect battery from being overcharged.
- Special synchronization effects. It is a snap to make a string of lights with AM-series flashers to synchronize with each other. There is more. With APICalibrator II, you can introduce a special extra delay (Ripple Delay) into the sync mechanism, to create special synchronized flashing patterns. For example, you

have a multiple lights system made up of AM-series flashers. Leave light1 as it is, so the ripple-delay is 0. Set Ripple-delay of light2 to 50ms, Ripple-delay of light3 to 100ms, that of light4 to 150ms, … Now, light2 will start each flashing cycle 50ms behind that of light1's. Light3 will be behind light1 100ms or 50ms behind light2. Light4 will be behind light1 150ms or 50ms behind Light3, etc… In effect, these lights are now flashing in ripple waves. Other patterns, such as alternating, jumping, can also be generated by tinkering with the Ripple-delays.

For instruction on how to use the APICalibrator II software, please request for APICabrator II manual.

Installation

Drawing M-6929-C shows the terminal layout and basic wiring diagram of AM-7PD.

Drawing M-6609-C is the block diagram of AM-7PD.

Please refer to drawing M-6599-C when connecting AM-7P to RS485 bus.

Drawing S-7430-C shows the location of Flashing code and current level switches.

Light-Fail and Code-Out signals can directly drive small relays of up to 60V, 115mA at ambient 25 degree C. In higher temperature environment, the rating shall be lower to prevent damage to the flasher.

Internal logic inside AM-7P uses LED channel 1 as the reference channel to set its internal operating parameters. Therefore, **it is imperative to use Channel 1 if only one LED channel is needed.** When multiple LED channels are needed, channel one must be used.

Do NOT run other channels (2,3,4) when Channel 1 is disconnected. Or a fault condition may result and prevent the flasher to work normally.

LED Monitoring and Flasher protection

LED failure output is an open-drain low-side FET switch. The switch (MOSFET) is open (disconnected from ground) when failure condition(s) is detected or unit loses its power. The switch is ON, when the unit is working normally.

Special notice on measuring LED currents

Channel 1 is the master channel. Measuring current in channel 1 is straightforward. Simply insert the Ampere meter between LED-CH1 terminal and the channel-1 LED. The negative probe should be on the terminal.

Measuring current in Channel 2,3,4 needs a little special attention. For the best efficiency, TracSwitcher in AM-7P automatically maintains a merely 0.4 volts over what is the minimum voltage required to drive the LEDs to get the desired current. When an ampere meter is inserted into any LED branches, a voltage drop is introduced into the branch. Depending on the current level and length of leads, the voltage drop may be higher than 0.4 volts. Since the LED driving voltage is set by referencing to channel-1, the extra voltage drop in channel-2 or 3 or 4, introduced by metering, may cause the actual voltage falling on the LED in that channel lower than that is needed. So the reading would be lower than it really is without metering. Therefore, a meter with about the same length lead wires must be inserted into channel-1 when measuring current in channel-2 or 3 or 4.

Set the LED light Intensity

Use the dial switch S3 to adjust the current that feeds to the LED light array. The higher the current, the brighter the light.

IMPORTANT:
DO not over drive the LED array. Running too much current will cause the LED array to overheat, which greatly shortens the service life of the LED arrays !!!

The current in each channel:

I (ma) = 50ma + S1 * 25ma

For example, when S3 is set to location 9, the current is 50+9*25 = 275mA

When S3 is set to 0, the current is set by APICalibrator II.

Switch locations A, B, C, D, E, F correspond to numbers 10,11,12,13,14,15.

Set the flash characteristics

Use the dial switches S1 and S2 to set the flashing characteristics. These two switches form a 2-digit hexidecimal number, with S1 being the least significant digit. Therefore, AM-7P supports 256 different flashing codes.

Switch FF is for user programmable code. Set to 22 if you want steady-burn.

For example, setting switch S1 to position B, S2 to position 3 will come to a HEX number 3B, which refers to flashing code:

0.8 on + 1.2 off + 0.8 on +1.2 off + 0.8 on +7.2 off

Please use attached Code Table to lookup other factory-installed flashing codes. Please be informed that the code table can be customized per your request. Please specify at the time of placing your order.